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Work-related musculoskeletal disorders among Egyptian physical therapists

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Abstract

Background: Physical therapists (PTs) are frequently exposed to work-related musculoskeletal disorders (WMSDs). There is limited evidence on the prevalence of these injuries and their potential risk factors in Egyptian PTs. This study aimed at estimating the prevalence of WMSDs among Egyptian PTs as well as potential risk factors and therapists' coping strategies. Further, it investigated the association between WMSDs and socioeconomic factors.

Results: Three hundred eighty-five eligible participants completed a survey. The prevalence of WMSDs was 99.5%. The five top affected anatomic regions were lower back (69.1%), neck (65.7%), shoulder (47.7%), wrist/hand (39.1%), and upper back (37.0%). Therapists rated awkward positions and handling of heavy patients as the most common predisposing factors for sustaining injuries. Regarding coping strategies, seeking informal help from peers to treat injuries-related symptoms and changing the posture of therapists and patients while working were mostly used by PTs. Overall, female therapists had higher injury prevalence than males (Cramer's $V < 0.5$, $p \leq 0.05$); except for upper back ($p > 0.05$). Education and working in multiple facilities simultaneously (public and private clinics) correlated significantly to sustaining injuries in the upper back ($V = 0.14$, $p = 0.049$ and $V = 0.178$, $p = 0.002$, respectively) and neck ($V = 0.16$, $p = .019$ and $V = 0.142$, $p = 0.020$, respectively). WMSDs were not associated with therapists' experience or specialty ($p > 0.05$).

Conclusion: WMSDs injuries in PTs are prevalent in Egypt, especially in females, therapists with lower academic education, and those working in multiple facilities simultaneously.

Keywords: Musculoskeletal disorders, Occupation, Physical therapy, Work-related disorders

Background

Work-related musculoskeletal disorders (WMSDs) are injuries or illnesses resulting from increased occupational demands and may adversely affect the neuromusculoskeletal system. These injuries may manifest as pain, soreness, impairment, and dysfunction secondary to damaged muscle, ligament, cartilage, or other connective tissues. The severity of these injuries range from mild (requiring a few days to recover) to severe injuries that may need specialized therapeutic intervention [1–3]. WMSDs have been linked to physical and mechanical [4], physiological [5], psychological [6–8], and occupational factors [9, 10]. Occupational injuries are prevalent among healthcare professionals [11–13]. Physical therapists (PTs) in specific are routinely exposed to work-related physically demanding tasks such as handling patients, applying manual techniques and assuming sustained improper positions, which may lead to the development of WMSDs [10, 14–17]. This subsequently may reduce therapists' quality of life [17] and work productivity [11] as well as increase the economic cost associated with treating such injuries [9, 14, 18, 19]. The prevalence of WMSDs sustained by PTs worldwide ranges between 40 and 96% [10, 15, 20–26]. It is considerably high in developed western industrial countries such as the USA, Australia, and England (96%, 91% and 68%, respectively) [10, 14, 25]. This is also true for Asian

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countries such as Pakistan, Iran, and Kuwait in which injuries range between 56 and 94% [20, 22, 24].

As the etiology of WMSDs is multifactorial and may be influenced by the practice and infra-structures of different clinical settings in various countries, thus, identifying potential physical risk factors relevant to a particular setting (e.g., Egyptian health care system) could guide mechanistic research and help in developing effective prevention and treatment strategies [27]. This in turn is expected to reduce illness-related absenteeism, improving work productivity, and hence, reduce the socioeconomical burdens associated with WMSDs [17].

In a high-density population and low-resource country like Egypt, a few attempts were made to estimate the prevalence of WMSDs in PTs. Early last decade, in 2012, the prevalence of WMSDs in 62 Egyptian PTs was estimated to be 63.9%; however, this study was limited by the small sample size [28]. Further, participants' eligibility criteria were not clear nor the language of the administrated questionnaire. Moreover, authors did not report gender-specific prevalence or the relationship between WMSDs and therapists' education or working conditions.

Later in 2014, 400 Egyptian PTs were surveyed to estimate the prevalence of WMSDs, which was found to be 90.7% with handling a heavy caseload reported as a major risk factor [29]. However, this study surveyed PTs who reside only in the capital city Cairo, a governorate that may have a different lifestyle and working conditions compared to other locations. Further, this study did not report the coping responses to sustained injuries. A previous report also estimated that 84.9% of Egyptian pediatric PTS sustained WMSDs that affected their career plans; however, this survey was limited to one specialization in physiotherapy practice [30].

In 2019, 501 Egyptian PTs were surveyed to investigate the prevalence, profile, predictors, and response to WMSDs [31]. The current study was conducted at the same time and used a different set of questions based on the famous Nordic questionnaire combined with questions from the Cromie et al. [14]. Both questionnaires have been commonly used in different studies to estimate the prevalence of WMSDs [15, 23, 25]. The primary purpose of the current study was to estimate the prevalence of WMSDs among Egyptian PTs and to identify potential risk factors and coping responses. Further, this study investigated the association between WMSDs and therapists' socio-demographic factors. Although the purpose and procedure of the current study are similar to that of Khairy et al. [31], yet a confirmation of WMSDs prevalence using a different set of questions will improve the understanding of the problem size in the Egyptian community, and hence, authorities would be encouraged to take appropriate preventive strategies. Further, the language of questionnaire administration in Khairy et al. [31] study was not stated.

In the current study, in order to ensure its linguistic clarity, the questionnaire was administrated in the Arabic language, the native language of the participants. Even though the target population received at least basic physiotherapy education in English language, yet language proficiency level may vary among PTs. Thus, we opted from using a full-length English questionnaire and used instead an Arabic language-translated version to reduce potential effects of language barrier on completing the questionnaire by PTs with various English proficiency level. This is in an agreement with the finding that reading in a native language can be done quicker than in a second language [32]. The Arabic translation of the Nordic questionnaire has been validated previously (Cronbach coefficient > 0.87) [33].

Methods

This is a cross-sectional survey study. The study was approved and conducted in accordance to the guidelines of the Ethics committee of the Faculty of Physical Therapy, Cairo University, Egypt (P.T.REC/012/001699).

Recruitment method

Invitations were sent to Egyptian PTs with a standard message to motivate therapists to participate in the survey. Further, the survey was announced on relevant professional and recreational Facebook groups and pages. In addition, therapists from different governorates were contacted directly and were invited to participate.

Eligibility criteria

Male and female therapists were eligible to participate if they fulfilled the following inclusion criteria: (1) graduated from an Egyptian university, (2) licensed to work in Egypt, and (3) have at least one year of experience. Participants were excluded if they were not currently practicing in Egypt, were non-Egyptians, or had an experience of less than one year after graduation.

Sample size calculation

The target population was PTs across Egypt. For sample size calculation, the population was assumed to be 20,000 therapists, as the sample size does not change much for larger populations. To achieve a 95% CI with a 5% margin of error and 50% response distribution, the current study required 377 therapists to represent the population (www.raosoft.com/samplesize.html). However, the study enrolled 401 participants to compensate for disqualifying responses.

Survey sections

A self-administered online questionnaire was adopted from Standardized Nordic Questionnaire [34] to identify injury anatomic locations. Further, questions from Cromie et al. [14] were also used to inquire about the most common risk factors as well as strategies used by Egyptian PTs to cope with these injuries. The questionnaire included closed and open-ended questions and consisted of three sections: (1) an introduction to explain the study goals and survey structure as well as to obtain an informed consent from therapists willing to participate in the study to authorize the researchers to publish collected data; (2) questions about demographic information such as gender, years of experience, the highest educational degree completed, work setting, and specialty; and (3) questions about the anatomic distribution and severity of musculoskeletal injuries, potential risk factors, and coping responses to injuries, if present (Additional file 1).

The questionnaire was translated by two expert PTs fluent in both the Arabic and English languages, with at least 10 years of experience. Translation was guided by a previous Arabic translation of the Nordic questionnaire [33]. Translation consensus was done before the translated version was piloted on a sample of 20 PTs (with different levels of experience) prior to actual data collection to ensure its linguistic clarity and to resolve any ambiguity.

Data collection and statistical analysis

Descriptive statistics were used to express the prevalence of WMSDs, risk factors, and coping responses in Egyptian PTs. Independent sample t test was performed to compare between the ages of male and female PTs, and Chi-square test was used to examine the association between the highest five prevalent WMSDs and demographic variables. When significant association was declared, Cramer's V test was employed to assess the strength of association. All statistical analyses were done using the SPSS version 21 (IBM incorporation, IL, USA), with the significance level set at $p \leq 0.05$.

Results

This study received 401 responses. Sixteen responses were excluded (13 were filled out by non-Egyptian PTs and three responses due to incomplete basic information), to yield a total of 385 valid responses.

Participants' demographics

The mean and standard deviation (SD) age of female therapists was 27.9 ± 4.8, and that of males was 29.4 ± 6.0 years. Males were significantly older than female therapists (p = 0.002). Participants' experience level, academic education, and specialty as well as working facility are provided in Table 1 and Fig. 1.

Prevalence and characteristics of participants with WMSDs

Musculoskeletal disorders were experienced by 99.5% (n = 383) of the respondents, while only two participants (0.5%) were free from any disorder. Based on the anatomic location of disorders, all body regions were affected, with the top five prevalent anatomic regions being: (1) lower back (69.1%, n = 265), (2) neck (65.7%, n = 252), (3) shoulder (47.7%, n = 183), (4) wrist/hand (39.1%, n = 150), and (5) upper back (37%, n = 142) (Table 2). The symptoms described by participants and their severity are illustrated in Figs. 2 and 3. Almost one quarter (19.5%) of the surveyed PTs considered a career shift to avoid pain.

Risk factors related to WMSDs

A list made of 15 different factors were included in the survey in order to assess the main three categories of routinely practiced risk factors in the daily working tasks in physical therapy [14]. Those categories were therapist-related, patient-related, and work-related factors (Table 3). Over 40% of the participants chose 8 risk factors for WMSDs. The most common therapist-related factors were working in awkward or stationary positions by 62.8% and 52.9% of the participants, respectively, continue working despite injury or pain by 54.2%, and employing faulty body mechanics by 50.9%. For patient-related factors, handling of heavy patients was stated by 62.3%. For working conditions, the lack of adequate rest between cases was selected by 40.5% (Table 3).

Coping strategies and work impact

The participants were asked to reflect on the preferred reaction to pain or injuries sustained at work from a list of 10 different potential strategies (Table 4). The most commonly chosen coping approaches were seeking help of a peer therapist (51.9%) and adjusting patient's or therapist's body position (50.6%).

Association between WMSDs and socio-demographic factors

The total number of female therapists who suffered WMSDs was 207 (54.0%), whereas that of male therapists was 176 (45.9%). Female gender showed a weak significant association with injury in all 5 significant anatomic regions ($V < 0.5$, $p \leq 0.05$) except upper back ($p > 0.05$) (Table 5, Fig. 4). There was no significant association between the years of experience and the prevalence of WMSDs in the top five regions ($p > 0.05$). There was a significant weak

Table 1 Participants' Demographics

Demographic		*N* (%)
Gender	Female	207 (53.8)
	Male	178 (46.2)
Experience (In years)	1–5	185 (48.1)
	6–10	115 (29.9)
	11–15	59 (15.3)
	16–20	26 (6.8)
The highest education degree	Bachelor	235 (61.0)
	Masters	73 (19.0)
	Doctorate	64 (16.6)
	Diploma	13 (3.4)
Clinical practice settings	Governmental	139 (36.1)
	Private clinics	91 (23.6)
	Both sectors	155 (40.3)
Specialization	Orthopedic	85 (22.1)
	Neurology	15 (3.9)
	Pediatrics	50 (13.0)
	General (non-specialized practitioners)	235 (61.0)

association between education level and the prevalence of upper back (V = 0.14, p = 0.049) and neck dysfunction (V = 0.16, p = .019). There was no significant association between therapists' specialty and the prevalence of WMSDs (p > 0.05). There was a significant weak association between working facility and the prevalence of WMSDs in the neck (V = 0.178, p = 0.002) and upper back (V = 0.142, p = 0.020) (Table 5).

Discussion

The prevalence of WMSDs in Egyptian PTs was 99.5%, with the most prevalent anatomic locations being lower back (69.1%), neck (65.7%), shoulder (47.7%), wrist/hand (39.1%), and upper back (37%). Female PTs had a higher prevalence of WMSDs in all anatomic locations than male PTs, except for the upper back. Habitual faulty positions and heavy patients' handling were the highest risk factor for WMSDs. Therapists mostly sought an informal assistance from fellow colleagues to treat the injury-related symptoms. Another common coping strategy was to modify working posture of the therapist and/or the patient. WMSDs in lower back, neck, shoulder, and wrist/hand were significantly associated with PTs' education with a higher prevalence in therapists having a bachelor degree only. Also, therapists working simultaneously in public and private facilities showed the highest prevalence compared to those working in a single facility. WMSDs were not associated with therapists' specialty or experience.

This study surveyed the prevalence of WMSDs among Egyptian PTs and common risk factors as well as the most adapted coping strategies. Questions adopted from Standardized Nordic questionnaire as well as from a study by Cromie et al. [14]. Several studies examined the prevalence of WMSDs among healthcare professionals using self-designed surveys based on questions adapted from previous studies. For example, Glover et al. [25] in 2005 estimated WMSDs prevalence in PTs working in UK using a survey adapted from that of Cromie et al. [14], West and Gardner [26], and Kuorinka et al. [34]. Also, Adegoke et al. [23] surveyed Nigerian PTs for WMSDs prevalence using a questionnaire adapted from that of Cromie et al. [14] and West and Gardner [26].

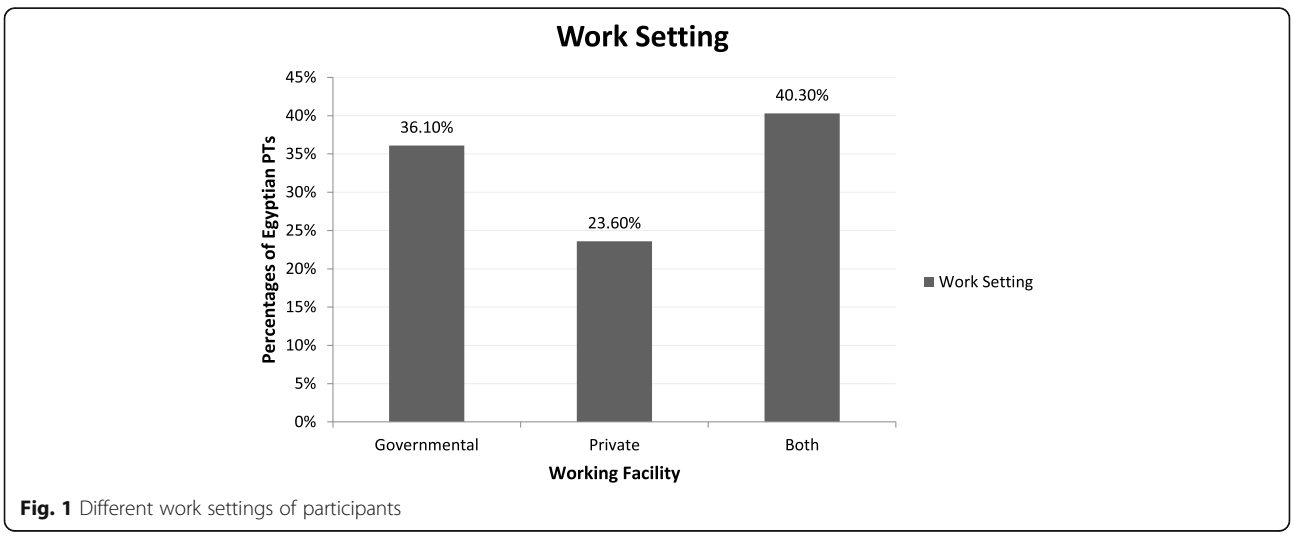

Fig. 1 Different work settings of participants

Table 2 Distribution of WMSDs as reported by participants

Anatomic location	No. (*n* = 383)	%
Lower back	265	69.1
Neck	252	65.7
Shoulders	183	47.7
Wrists/hands	150	39.1
Upper back	142	37.0
Thumbs	127	33.1
Knee	104	27.1
Ankle	31	8.0
Hips	27	7.0
Elbows	25	6.5

Further, Salik and Ozcan [15] and Vieira et al. [12] both investigated occupational injuries in Turkish PTs and American PTs, respectively, based their surveys on Cromie et al. [14].

The prevalence of WMSDs in this study is higher than that reported in similar studies conducted in Egypt (such as that of Melam et al. (63.9%) [28] and Khairy et al. (82.6%)) and worldwide (40–96%) [10, 16, 22, 23, 25, 26]. In this study, the top five affected regions were lower back, neck, shoulder, wrist, and hand as well as upper back. The prevalence of WMSD in those anatomic locations is in an agreement with previous research [28]. Previous studies conducted on Egyptian PTs reported the lower back, should, neck, upper back, wrist, and knee to be the most commonly injured regions [31], which is similar to the findings of the current study. The results of this study are also similar to that results of Salik and Oscan [15], although with a different order (lower back, hand-wrist, shoulders, and neck). The most prevalent regions registered by other studies were lower back, wrist/hand, neck, and shoulder [35], or lower back followed by wrists and hands [14], or lower back and neck [10, 23]. In Glover et al.'s survey [25], 69% PTs rated the spine as the most injured region and 5% rated the lower limbs as the least. A study conducted in Iran also reported similar findings to that of the current study with regards to prevalence of injury in the neck, shoulders, wrist, and upper back, although lower back region injury was not reported [22].

Lower back dysfunction was prevalent in 68.9% of the surveyed therapists, which is three times higher than that reported in a previous study in Egypt [28], yet within global ranges (26 to 69.8%) [14, 15, 22–25, 36, 37]. This is in an agreement with a another study conducted in Egypt that published a prevalence of 68.8% [31]. This prevalence is believed to be higher in countries with poor economy that have a high patient/therapists ratio and lack appropriate (ergonomic) equipment [23]. Manual techniques require PTs to repeatedly assume stressful postures (forward trunk flexion and rotation), reach forward, and exert forceful contraction of upper limb muscles. A recurrent mixture of forward flexion, lateral bending, and rotation can considerably load the spinal joints and cause pain [38]. As low back pain is associated with weaker core muscles and insufficient motor control [39–42], physically unfit therapists

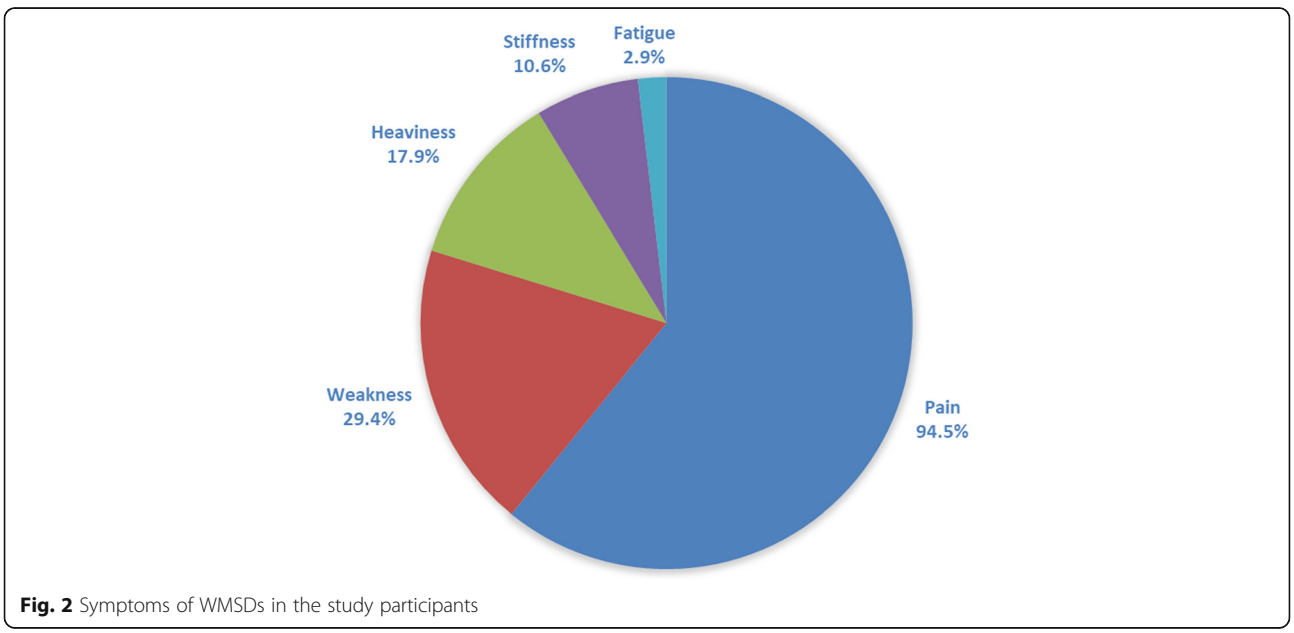

Fig. 2 Symptoms of WMSDs in the study participants

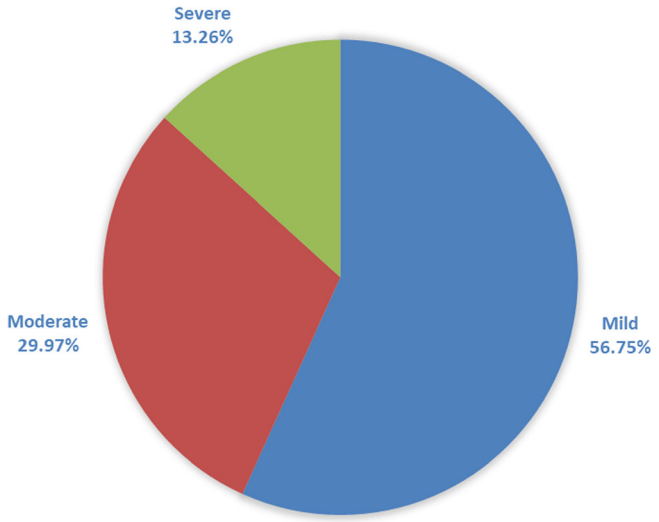

Fig. 3 Severity of pain in study participant

may get more predisposition to injury. Further, Egyptians have a high prevalence abdominal fat [43, 44] and hence higher body mass index (BMI), which is believed to be a jeopardizing factor for WMSDs [16]. Antigravity muscles show impaired activation with adiposity [45]. Thus, when core muscles are weak, lumbar vertebrae are at higher risk of injuries [39]. Yet, it should be emphasized that participants were not asked about their BMI; thus, this hypothesis cannot be confirmed.

The national prevalence of neck injuries in this study (65.1%) is almost double that reported in previous studies [28], yet it lies within published range (11.8–61.1%) worldwide [10, 15, 22, 23, 25, 26]. It is also much higher than the 36.7% prevalence reported in Khairy et al.'s study [31]. The shoulder dysfunction has a prevalence of 47% which is similar to the results issued in 2019 [31]. It is over two times greater than the 15.3% reported by Melam [28], although it is a slightly higher than the highest prevalence documented in literature (0.9–43.4%) [24, 46]. Neck and shoulder dysfunctions have been linked to occupational physical exposure such as repetitive manual handling, e.g., lifting, holding, and pushing; working in awkward or static postures; and working with arms above shoulder level [47]. Hand injury prevalence

Table 3 Potential risk factors for WMSDs

Factors	Tasks causing injury	No. (*n* = 383)	%
Therapist-related	Working in awkward positions such as bending knees of flexing back	242	62.8
	Taking stationary positions for a long time	204	52.9
	Incorrectly using your body mechanics	196	50.9
	Repeated bending and twisting	186	48.3
	Working beyond your physical abilities	144	37.4
	Lack of receiving proper training to accommodate your body mechanics with work demands	115	29.8
Patient-related	Dealing with heavy patients	240	62.3
	Having to move patients passively	163	42.3
	Having to save falling patients	70	18.1
Work-related	Continue work despite injury or pain	209	54.2
	Lake of sufficient resting time between cases	156	40.5
	Examining and treating lots of patients daily	108	28.0
	Repeating the same treatment technique	98	25.4
	Working area is very narrow and wouldn't allow me to work without adding physical stress	81	21.0
	Using ergonomically improper tools	73	18.9

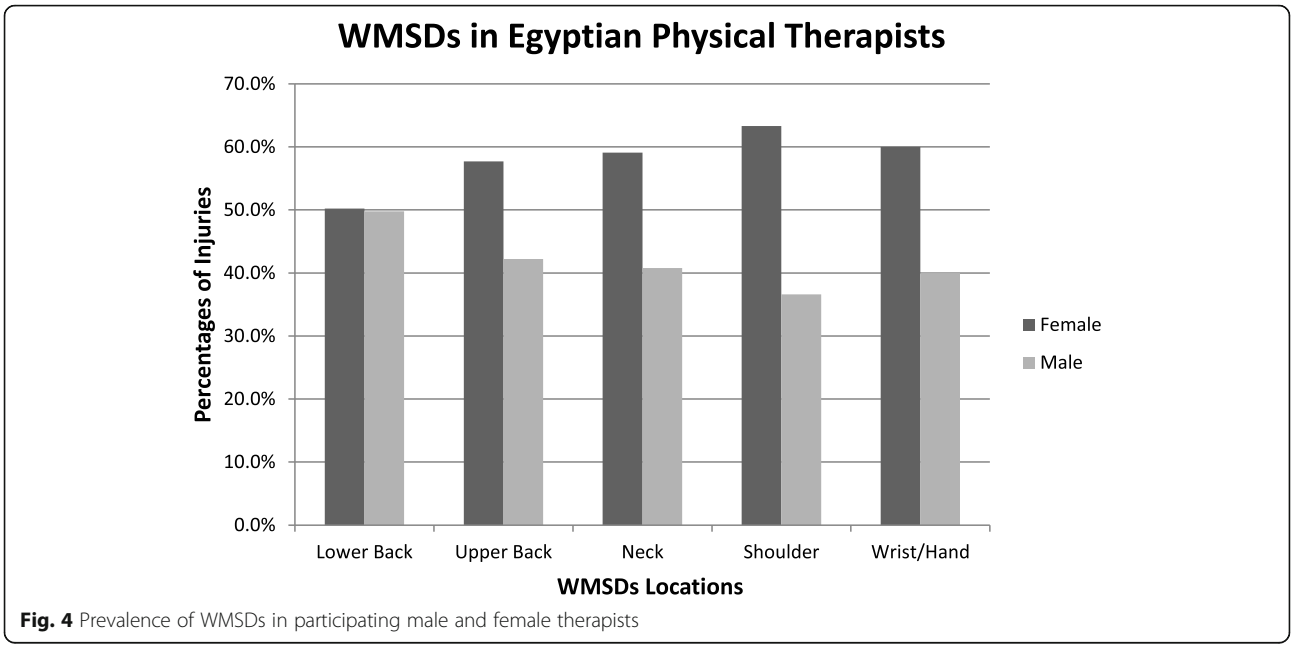

Fig. 4 Prevalence of WMSDs in participating male and female therapists

was 38.8% in this study vs. 29% and 14.5% in previous studies [28, 31] and within the internationally wide range that lies between 2.9 and 83% [24, 48]. The injuries in Iranian PTs were close to that reported in Egyptian PTs with a prevalence of 37.9% [22]. PTs use their hands constantly in applying manual tasks [49]. Repetitive forceful manual movements contribute considerably to WMSDs as they overload the musculatures of the upper limbs, particularly the small muscles of the wrist and hand. Prolonged repeated loading may result in overuse injuries of these structures and, even, central nervous system adaptation [50, 51].

Table 4 Distribution of coping strategies used by Egyptian PTs

Coping strategy	No. (*n* = 383)	%
Seek help of a physiotherapist	199	51.9
Adjust the patient's position or mine	194	50.6
Give up the technique for a less painful one	110	28.7
Take regular breaks or at fatigue	102	26.6
Use a splint or kinesiotaping	99	25.8
Adjust the plinth height	78	20.3
Seek help of a physician	71	18.5
Take a sick leave	70	18.2
Request help from a colleague for handling the case	67	17.4
Perform warms up or exercise regularly	49	12.7

The most rated symptoms in the current survey were pain (94.5%), heaviness (17.9%), stiffness (10.6%), weakness (29.4%), and fatigue (2.9%). This is in an agreement with the reported prevalence in Alrowayeh et al.'s study where pain was the most prevalent complaint in the studied anatomic regions (78.4–100%), followed by cramp/spasm (18.9–76.1%), and stiffness (12.5–53.6%) [20]. Due to the scarcity of reported symptoms of Egyptian PTs in literature, we could not compare the reported WMSDs symptoms results to other studies.

Respondents to this survey identified some factors that they believed relevant to sustaining WMSDs. Half of those factors were directly related to repeated and prolonged faulty utilization of mechanical postures while working such as assuming awkward positions as bending knees while flexing the back, prolonged stationary positions, inappropriate utilization of body mechanics, and repeated bending and twisting. Although Egyptian undergraduate physical therapy education offers several courses in biomechanics and ergonomics, yet respondents do not feel their training was sufficient to prevent injury in real world practice. Future research is recommended to investigate potential improvements in basic education curriculums to minimize the incidence of these injuries.

Previous studies reported WMSDs associated with working in uncomfortable or stationary positions such as prolonged and repeated bending and twisting to range between 10 and 64.6% [15, 23–25, 37]. In this study, the top work-related risk factors

Table 5 Distribution of WRMDs by socio-demographic variables

Variable (No.)		Lower back			Upper back			Neck			Shoulder			Wrist/hand		
		No. (*n* = 265)	%	*p*	No. (*n* = 142)	%	*p*	No. (*n* = 252)	%	*p*	No. (*n* = 183)	%	*p*	No. (*n* = 150)	%	*p*
Gender	Female (207)	133	50.2	0.036*	82	57.7	0.321	149	59.1	0.004*	116	63.3	0.000*	90	60.0	0.05*
	Male (178)	132	49.8		60	42.2		103	40.8		67	36.6		60	40.0	
Experience (in years)	1–5 (175)	123	46.4	0.828	69	48.5	0.101	109	43.2	0.658	86	46.9	0.263	65	43.3	0.926
	6–10 (115)	81	30.5		49	34.5		79	31.3		5	2.7		47	31.3	
	11–15 (59)	38	14.3		15	10.6		41	16.2		21	11.4		24	16.0	
	16–20 (26)	17	4.6		7	4.9		16	6.3		13	7.1		10	6.6	
	> 20 (10)	6	2.2		2	1.4		7	2.7		6	3.2		4	2.6	
Education degree	BSc (235)	165	62.2	0.696	94	66.1	0.049*	144	57.1	0.019*	112	61.2	0.758	88	58.6	0.264
	MSc (73)	51	19.2		21	14.7		59	23.4		34	18.5		26	17.3	
	PhD (64)	40	15.0		19	13.3		42	16.6		29	15.8		28	18.6	
	Diploma (13)	9	3.3		8	5.6		7	2.7		8	4.3		8	5.3	
Specialty	General (235)	169	63.7	0.060	91	64.0	0.145	151	59.9	0.788	114	62.2	0.142	96	64.0	0.626
	Orthopedic (85)	50	18.8		35	24.6		59	23.4		46	25.1		29	19.3	
	Neurology (15)	13	4.9		3	2.1		10	3.9		5	2.7		7	4.6	
	Pediatrics (50)	33	12.4		13	9.1		32	12.6		18	9.8		18	12.0	
Working facility	Public (139)	86	32.4	0.086	45	31.6	0.020*	99	39.2	0.002*	60	32.7	0.284	52	34.6	0.846
	Private (91)	66	24.9		27	19.0		46	18.2		42	22.9		35	23.3	
	Both (155)	113	42.6		70	49.2		107	42.4		81	44.2		63	42.0	

*Significant association ($p \leq 0.05$)

ranked by PTs were working in awkward body positions and dealing with heavy patients. Similarly, Khairy et al. [31] reported manual therapy, prolonged stationary positions, and fatigue to be the most common WMSDs risk factors reported by Egyptian PTs. Manual therapy has also been claimed to be a risk factor in Melam's survey[28].

In this survey, more than 50.0% of the PTs who suffered WMSDs preferred to seek help of a fellow PT or to improve their body mechanics or to change patient's position as coping mechanisms. This is also in an agreement with previously reported coping strategies, in addition to having work breaks between cases [31]. In Melam's study [28], the top strategies adapted by therapists included consulting physicians and taking sick leaves and relevant medications. Other PT population such as Turkish [15] reported the most common responses to be improving body mechanics, changing work position, and avoiding heavy lifting, whereas PTs of UK [25] tended to adjust the position of the patient or the plinth. Only 28.2% of our respondents employed the survivor bias by giving up the painful technique to less harmful one, which might be attributed to the limited work experience (1-5 years) of the majority of injured PTs in our sample. This percentage is greatly less than that reported by Cromie et al. [14], where 73.4% of PTs changed or modified their techniques due to injury. This was also true in previous reports in Egyptian [31] and Kuwaiti PTs [20]. This confirms a previous findings by Glover [25] who reported that injured PTs sought informal treatment by fellow PTs, rather than officially documenting injury. This raises a concern regarding the officially WMSDs reporting magnitude.

For gender association with WMSDS, our findings are in agreement with Glover et al. [25], Alrowayeh et al. [20], and Adegoke et al. [23], who reported that female therapists had significantly higher disorders than male PTs. This gender disparity of injury prevalence was attributed to higher psychological stresses in females, the influence of fluctuating female hormones, gender-specific difference in pain coping strategies, and the effect of familial factors that may change pain responses

[52–55]. Further, Fredriksson et al. [56] reported that females were more likely to be injured with long-term mentally stressful work as well as the lack of sufficient leisure time. In Egypt, the culture increases the domestic task demands on women [57], which may add more physical stresses, and hence, increase their predisposition to musculoskeletal dysfunctions. It should be emphasized that Melam's [28] and Khairy et al.'s [31] studies did not report regional gender-specific prevalence nor correlation.

Injury rate among junior PTs was previously reported to be much higher than among senior ones; particularly in the first 5 years of their career or under the age of 30 [13, 14]. Egyptian PTs' years of experience did not show any significant correlation with WMSDs prevalence. However, most of the injured PTs in this study were those with 1 to 5 years of experience. This could be explained by junior PT working in more physically challenging positions [13], whereas seniors usually have more of their time allocated to administrative and managerial tasks than manual work [58]. Further, senior PTs are more competent in overcoming physically stressful situations by selecting alternative techniques based on their experience (known as the survivor bias) [14]. Khairy et al. [31] reported a higher prevalence in young Egyptian PTs of (29.9 ± 6.4) who are less experienced and probably need further training from their senior peers.

The higher the educational degree obtained by Egyptian PTs, the less likely they have neck and upper back problems, except for professional diploma. This may imply that basic educational training does not equip novice PTs with proper training to avoid injury. It should be emphasized that PTs with diploma were under sized in the current sample, and no solid conclusion could be generalized to this subpopulation.

Egyptian PTs who worked in private physiotherapy centers had a 54.8% prevalence of WMSDs in a precedent study [31]. In this study, working in two different types of facilities (public and private) simultaneously was associated with higher injury prevalence. Egypt economic burden drives most of PTs, especially younger therapists, to work in more than one facility simultaneously, subjecting them to long working hours, lack of rest, heavy caseload, and working with different equipment according to what is available at different settings. Darragh et al. [21] concluded that therapists who work in departments with heavy, hectic caseload such as acute care and outpatient rehabilitation sustain more WMSDs than those working in other less demanding settings. It should be emphasized that the correlation between injuries and professional experience, education, specialty, and work facility in Egyptian PTs was not investigated in previous work [28].

In this study, therapists who are general non-specialized practitioners had a higher prevalence of WMSDs. This contradicts with the findings that WMSDs affect different body parts according to specialty and tasks [10, 12, 16, 59]. The disagreement shown in our results could be attributed to practicing conditions in which therapists are required to deal with a higher caseload in less equipped facilities, regardless to their demographics.

This study investigated the prevalence of WMSDs in an adequate sample of Egyptian PTs. The results of this survey should be considered by Egyptian health and educational authorities to investigate potential preventive measures against WMSDs. Those preventive strategies should be carefully planned to decrease injuries especially of the top five anatomical areas commonly injured. Further, preventive strategies should be directed to reduce injury risk factors in females and novice PTs. These strategies may include adequate training especially on the proper work posture, ergonomic designing of work environment, and reasonable working hours and caseload.

However, a few limitations exist including (1) the sample was non-stratified, which under-presented some sub-groups such as therapists with professional diploma; (2) being an online survey limited available sample to therapist who can access the internet and who have computer skills, which may not be available in remote under-privileged areas; and (3) therapists self-reported WMSDs rather than had a confirmed diagnosis by a specialized healthcare professional. Future studies are encouraged to address these limitations and to consider prospective cohort studies with a stratified representative sample to estimate the incidence of WMSDs in Egyptian PTs. Further studies should incorporate a more qualitative approach to get more details of psychological and socioeconomical aspects of WMSDs.

Conclusion

WMSDs are prevalent in 99.5% of Egyptian PTs. The most five affected anatomic locations were the lower back, neck, shoulder, and wrist/hands and upper back. The most common risk factors were working in faulty positions or treating obese patients. The most common coping strategies were seeking the help of a peer therapist or changing work position. WMSD prevalence was associated with being a female therapist, having a bachelor degree, and working in more than one facility simultaneously. There was no evidence to support the association between experience or specialty and the prevalence of WMSDs.

Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s43161-021-00025-z.

Additional file 1:. Survey for Work- Related Musculoskeletal Disorders among Egyptian Physical Therapists.

Abbreviations

WMSDs: Work-related musculoskeletal disorders; PTs: Physical therapists

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Authors' contributions

WA: conception of the research idea; design of the work; acquisition, analysis, and interpretation of data; drafted the work; approved the submitted version; and have agreed both to be personally accountable for the author's own contributions and to ensure that questions related to the accuracy or integrity of any part of the work, even ones in which the author was not personally involved, are appropriately investigated, resolved, and the resolution documented in the literature. *ARY*: conception and refining of the research idea; design of the work; acquisition, analysis and interpretation of data; critically revised manuscript drafts; approved the final submitted version; and have agreed both to be personally accountable for the author's own contributions and to ensure that questions related to the accuracy or integrity of any part of the work, even ones in which the author was not personally involved, are appropriately investigated, resolved, and the resolution documented in the literature.

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Availability of data and materials

Data and materials are available if needed.

Declarations

Ethics approval and consent to participate

The study was approved and conducted in accordance to the guidelines of the Ethics Committee of the Faculty of Physical Therapy, Cairo University, Egypt (P.T.REC/012/001699).
The questionnaire included an introduction to explain the study goals and survey structure as well as to obtain an informed consent from therapists willing to participate in the study to authorize the researchers to publish collected data.

Consent for publication

The questionnaire included an introduction that explained the goals of the study and survey's structure. Moreover, it included a consent authorization by participants to enable the researchers to collect, analyze and publish collected data.

Competing interests

The authors declare no competing interests.

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